SEQUENCE LISTING

<110> Clarkson, Kathleen A.
Fenel, Fred

<120> Modified Enzymes, Methods to Produce Modified Enzymes and Uses Thereof

<130> GC812-C1

<140> US 11/404,460
<141> 2006-04-14

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<160> 51

<170> FastSEQ for Windows Version 4.0

<210> 1
<211> 223
<212> PRT
<213> Trichoderma reesei

<400> 1

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 1               5                  10                  15
Val Leu Ala Ala Pro Ala Ala Glu Val Glu Ser Val Ala Val Glu Lys
            20                  25                  30
Arg Gln Thr Ile Gln Pro Gly Thr Gly Tyr Asn Asn Gly Tyr Phe Tyr
        35                  40                  45
Ser Tyr Trp Asn Asp Gly His Gly Gly Val Thr Tyr Thr Asn Gly Pro
    50                  55                  60
Gly Gly Gln Phe Ser Val Asn Trp Ser Asn Ser Gly Asn Phe Val Gly
65                  70                  75                  80
Gly Lys Gly Trp Gln Pro Gly Thr Lys Asn Lys Val Ile Asn Phe Ser
                85                  90                  95
Gly Ser Tyr Asn Pro Asn Gly Asn Ser Tyr Leu Ser Val Tyr Gly Trp
            100                 105                 110
Ser Arg Asn Pro Leu Ile Glu Tyr Tyr Ile Val Glu Asn Phe Gly Thr
        115                 120                 125
Tyr Asn Pro Ser Thr Gly Ala Thr Lys Leu Gly Glu Val Thr Ser Asp
    130                 135                 140
Gly Ser Val Tyr Asp Ile Tyr Arg Thr Gln Arg Val Asn Gln Pro Ser
145                 150                 155                 160
Ile Ile Gly Thr Ala Thr Phe Tyr Gln Tyr Trp Ser Val Arg Arg Asn
                165                 170                 175
His Arg Ser Ser Gly Ser Val Asn Thr Ala Asn His Phe Asn Ala Trp
            180                 185                 190
Ala Gln Gln Gly Leu Thr Leu Gly Thr Met Asp Tyr Gln Ile Val Ala
        195                 200                 205
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Val Glu Gly Tyr Phe Ser Ser Gly Ser Ala Ser Ile Thr Val Ser
210 215 220

<210> 2
<211> 781
<212> DNA
<213> Trichoderma reesei

<400> 2
atggtctcct tcacctccct cctcgccggc gtcgccgcca tctcgggcgt cttggccgct 60
cccgccgccg aggtcgaatc cgtggctgtg gagaagcgcc agacgattca gcccggcacg 120
ggctacaaca acggctactt ctactcgtac tggaacgatg gccacggcgg cgtgacgtac 180
accaatggtc ccggcgggca gttctccgtc aactggtcca actcgggcaa ctttgtcggc 240
ggcaagggat ggcagcccgg caccaagaac aagtaagact acctactctt acccccttg 300
accaacacag cacaacacaa tacaacacat gtgactacca atcatggaat cggatctaac 360
agctgtgttt tcaaaaaaaa gggtcatcaa cttctcgggc agctacaacc ccaacggcaa 420
cagctacctc tccgtgtacg gctggtcccg caacccccctg atcgagtact acatcgtcga 480
gaactttggc acctacaacc cgtccacggg cgccaccaag ctgggcgagg tcacctccga 540
cggcagcgtc tacgacattt accgcacgca gcgcgtcaac cagccgtcca tcatcggcac 600
cgccaccttt taccagtact ggtccgtccg ccgcaaccac cgctcgagcg gctccgtcaa 660
cacggcgaac cacttcaacg cgtgggctca gcaaggcctg acgctcggga cgatggatta 720
ccagattgtt gccgtggagg gttactttag ctctggctct gcttccatca ccgtcagcta 780
a 781

<210> 3
<211> 234
<212> PRT
<213> Trichoderma reesei

<400> 3
Met Lys Phe Leu Gln Val Leu Pro Ala Leu Ile Pro Ala Ala Leu Ala
1 5 10 15
Gln Thr Ser Cys Asp Gln Trp Ala Thr Phe Thr Gly Asn Gly Tyr Thr
20 25 30
Val Ser Asn Asn Leu Trp Gly Ala Ser Ala Gly Ser Gly Phe Gly Cys
35 40 45
Val Thr Ala Val Ser Leu Ser Gly Gly Ala Ser Trp His Ala Asp Trp
50 55 60
Gln Trp Ser Gly Gly Gln Asn Asn Val Lys Ser Tyr Gln Asn Ser Gln
65 70 75 80
Ile Ala Ile Pro Gln Lys Arg Thr Val Asn Ser Ile Ser Ser Met Pro
85 90 95
Thr Thr Ala Ser Trp Ser Tyr Ser Gly Ser Asn Ile Arg Ala Asn Val
100 105 110
Ala Tyr Asp Leu Phe Thr Ala Ala Asn Pro Asn His Val Thr Tyr Ser
115 120 125
Gly Asp Tyr Glu Leu Met Ile Trp Leu Gly Lys Tyr Gly Asp Ile Gly
130 135 140
Pro Ile Gly Ser Ser Gln Gly Thr Val Asn Val Gly Gly Gln Ser Trp
145 150 155 160
Thr Leu Tyr Tyr Gly Tyr Asn Gly Ala Met Gln Val Tyr Ser Phe Val
165 170 175
Ala Gln Thr Asn Thr Thr Asn Tyr Ser Gly Asp Val Lys Asn Phe Phe
180 185 190
Asn Tyr Leu Arg Asp Asn Lys Gly Tyr Asn Ala Ala Gly Gln Tyr Val
195 200 205
Leu Ser Tyr Gln Phe Gly Thr Glu Pro Phe Thr Gly Ser Gly Thr Leu

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    210                 215                 220
Asn Val Ala Ser Trp Thr Ala Ser Ile Asn
225                 230
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<210> 4
<211> 826
<212> DNA
<213> Trichoderma reesei

<400> 4

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atgaagttcc ttcaagtcct ccctgccctc ataccggccg ccctggccca aaccagctgt      60
gaccagtggg caaccttcac tggcaacggc tacacagtca gcaacaacct ttggggagca     120
tcagccggct ctggatttgg ctgcgtgacg gcggtatcgc tcagcggcgg ggcctcctgg     180
cacgcagact ggcagtggtc cggcggccag aacaacgtca agtcgtacca gaactctcag     240
attgccattc cccagaagag gaccgtcaac agcatcagca gcatgcccac cactgccagc     300
tggagctaca gcgggagcaa catccgcgct aatgttgcgt atgacttgtt caccgcagcc     360
aacccgaatc atgtcacgta ctcgggagac tacgaactca tgatctggta agccataaga     420
agtgaccctc cttgatagtt tcgactaaca acatgtcttg aggcttggca aatacggcga     480
tattgggccg attgggtcct cacagggaac agtcaacgtc ggtggccaga gctggacgct     540
ctactatggc tacaacggag ccatgcaagt ctattccttt gtggcccaga ccaacactac     600
caactacagc ggagatgtca agaacttctt caattatctc cgagacaata aaggatacaa     660
cgctgcaggc caatatgttc ttagtaagtc accctcactg tgactgggct gagtttgttg     720
caacgtttgc taacaaaacc ttcgtatagg ctaccaattt ggtaccgagc ccttcacggg     780
cagtggaact ctgaacgtcg catcctggac cgcatctatc aactaa                    826
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<210> 5
<211> 222
<212> PRT
<213> Trichoderma reesei

<400> 5

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Met Val Ser Phe Thr Ser Leu Leu Ala Ala Ser Pro Pro Ser Arg Ala
 1               5                  10                  15
Ser Cys Arg Pro Ala Ala Glu Val Glu Ser Val Ala Val Glu Lys Arg
            20                  25                  30
Gln Thr Ile Gln Pro Gly Thr Gly Tyr Asn Asn Gly Tyr Phe Tyr Ser
        35                  40                  45
Tyr Trp Asn Asp Gly His Gly Gly Val Thr Tyr Thr Asn Gly Pro Gly
    50                  55                  60
Gly Gln Phe Ser Val Asn Trp Ser Asn Ser Gly Asn Phe Val Gly Gly
65                  70                  75                  80
Lys Gly Trp Gln Pro Gly Thr Lys Asn Lys Val Ile Asn Phe Ser Gly
                85                  90                  95
Ser Tyr Asn Pro Asn Gly Asn Ser Tyr Leu Ser Val Tyr Gly Trp Ser
            100                 105                 110
Arg Asn Pro Leu Ile Glu Tyr Tyr Ile Val Glu Asn Phe Gly Thr Tyr
        115                 120                 125
Asn Pro Ser Thr Gly Ala Thr Lys Leu Gly Glu Val Thr Ser Asp Gly
    130                 135                 140
Ser Val Tyr Asp Ile Tyr Arg Thr Gln Arg Val Asn Gln Pro Ser Ile
145                 150                 155                 160
Ile Gly Thr Ala Thr Phe Tyr Gln Tyr Trp Ser Val Arg Arg Asn His
                165                 170                 175
Arg Ser Ser Gly Ser Val Asn Thr Ala Asn His Phe Asn Ala Trp Ala
            180                 185                 190
Gln Gln Gly Leu Thr Leu Gly Thr Met Asp Tyr Gln Ile Val Ala Val
        195                 200                 205
```

Glu Gly Tyr Phe Ser Ser Gly Ser Ala Ser Ile Thr Val Ser
210 215 220

<210> 6
<211> 227
<212> PRT
<213> Humicola insolens

<400> 6
Met Val Ser Leu Lys Ser Val Leu Ala Ala Ala Thr Ala Val Ser Ser
1 5 10 15
Ala Ile Ala Ala Pro Phe Asp Phe Val Pro Arg Asp Asn Ser Thr Ala
20 25 30
Leu Gln Ala Arg Gln Val Thr Pro Asn Ala Glu Gly Trp His Asn Gly
35 40 45
Tyr Phe Tyr Ser Trp Trp Ser Asp Gly Gly Gly Gln Val Gln Tyr Thr
50 55 60
Asn Leu Glu Gly Ser Arg Tyr Gln Val Arg Trp Arg Asn Thr Gly Asn
65 70 75 80
Phe Val Gly Gly Lys Gly Trp Asn Pro Gly Thr Gly Arg Thr Ile Asn
85 90 95
Tyr Gly Gly Tyr Phe Asn Pro Gln Gly Asn Gly Tyr Leu Ala Val Tyr
100 105 110
Gly Trp Thr Arg Asn Pro Leu Val Glu Tyr Tyr Val Ile Glu Ser Tyr
115 120 125
Gly Thr Tyr Asn Pro Gly Ser Gln Ala Gln Tyr Lys Gly Thr Phe Tyr
130 135 140
Thr Asp Gly Asp Gln Tyr Asp Ile Phe Val Ser Thr Arg Tyr Asn Gln
145 150 155 160
Pro Ser Ile Asp Gly Thr Arg Thr Phe Gln Gln Tyr Trp Ser Ile Arg
165 170 175
Lys Asn Lys Arg Val Gly Gly Ser Val Asn Met Gln Asn His Phe Asn
180 185 190
Ala Trp Gln Gln His Gly Met Pro Leu Gly Gln His Tyr Tyr Gln Val
195 200 205
Val Ala Thr Glu Gly Tyr Gln Ser Ser Gly Glu Ser Asp Ile Tyr Val
210 215 220
Gln Thr His
225

<210> 7
<211> 210
<212> PRT
<213> Bacillus stearothermophilus

<400> 7
Met Lys Leu Lys Lys Lys Met Leu Thr Leu Leu Leu Thr Ala Ser Met
1 5 10 15
Ser Phe Gly Leu Phe Gly Ala Thr Ser Ser Ala Ala Thr Asp Tyr Trp
20 25 30
Gln Tyr Trp Thr Asp Gly Gly Gly Met Val Asn Ala Val Asn Gly Pro
35 40 45
Gly Gly Asn Tyr Ser Val Thr Trp Gln Asn Thr Gly Asn Phe Val Val
50 55 60
Gly Lys Gly Trp Thr Val Gly Ser Pro Asn Arg Val Ile Asn Tyr Asn
65 70 75 80
Ala Gly Ile Trp Glu Pro Ser Gly Asn Gly Tyr Leu Thr Leu Tyr Gly

```
                85                  90                  95
Trp Thr Arg Asn Ala Leu Ile Glu Tyr Tyr Val Val Asp Ser Trp Gly
            100                 105                 110
Thr Tyr Arg Pro Thr Gly Asn Tyr Lys Gly Thr Val Asn Ser Asp Gly
        115                 120                 125
Gly Thr Tyr Asp Ile Tyr Thr Thr Met Arg Tyr Asn Ala Pro Ser Ile
    130                 135                 140
Asp Gly Thr Gln Thr Phe Gln Gln Phe Trp Ser Val Arg Gln Ser Lys
145                 150                 155                 160
Arg Pro Thr Gly Ser Asn Val Ser Ile Thr Phe Ser Asn His Val Asn
                165                 170                 175
Ala Trp Arg Ser Lys Gly Met Asn Leu Gly Ser Ser Trp Ala Tyr Gln
            180                 185                 190
Val Leu Ala Thr Glu Gly Tyr Gln Ser Ser Gly Arg Ser Asn Val Thr
        195                 200                 205
Val Trp
    210
```

<210> 8
<211> 229
<212> PRT
<213> Trichoderma reesei

<400> 8

```
Met Val Ala Phe Ser Ser Leu Ile Cys Ala Leu Thr Ser Ile Ala Ser
 1               5                  10                  15
Thr Leu Ala Met Pro Thr Gly Leu Glu Pro Glu Ser Ser Val Asn Val
            20                  25                  30
Thr Glu Arg Gly Met Tyr Asp Phe Val Leu Gly Ala His Asn Asp His
        35                  40                  45
Arg Arg Arg Ala Ser Ile Asn Tyr Asp Gln Asn Tyr Gln Thr Gly Gly
    50                  55                  60
Gln Val Ser Tyr Ser Pro Ser Asn Thr Gly Phe Ser Val Asn Trp Asn
65                  70                  75                  80
Thr Gln Asp Asp Phe Val Val Gly Val Gly Trp Thr Thr Gly Ser Ser
                85                  90                  95
Ala Pro Ile Asn Phe Gly Gly Ser Phe Ser Val Asn Ser Gly Thr Gly
            100                 105                 110
Leu Leu Ser Val Tyr Gly Trp Ser Thr Asn Pro Leu Val Glu Tyr Tyr
        115                 120                 125
Ile Met Glu Asp Asn His Asn Tyr Pro Ala Gln Gly Thr Val Lys Gly
    130                 135                 140
Thr Val Thr Ser Asp Gly Ala Thr Tyr Thr Ile Trp Glu Asn Thr Arg
145                 150                 155                 160
Val Asn Glu Pro Ser Ile Gln Gly Thr Ala Thr Phe Asn Gln Tyr Ile
                165                 170                 175
Ser Val Arg Asn Ser Pro Arg Thr Ser Gly Thr Val Thr Val Gln Asn
            180                 185                 190
His Phe Asn Ala Trp Ala Ser Leu Gly Leu His Leu Gly Gln Met Asn
        195                 200                 205
Tyr Gln Val Val Ala Val Glu Gly Trp Gly Gly Ser Gly Ser Ala Ser
    210                 215                 220
Gln Ser Val Ser Asn
225
```

<210> 9
<211> 211

<212> PRT
<213> Aspergillus awamori

<400> 9
Met Lys Val Thr Ala Ala Phe Ala Gly Leu Leu Val Thr Ala Phe Ala
 1   5   10   15
Ala Pro Val Pro Glu Pro Val Leu Val Ser Arg Ser Ala Gly Ile Asn
            20   25   30
Tyr Val Gln Asn Tyr Asn Gly Asn Leu Gly Asp Phe Thr Tyr Asp Glu
        35   40   45
Ser Ala Gly Thr Phe Ser Met Tyr Trp Glu Asp Gly Val Ser Ser Asp
    50   55   60
Phe Val Val Gly Leu Gly Trp Thr Thr Gly Ser Ser Asn Ala Ile Thr
65   70   75   80
Tyr Ser Ala Glu Tyr Ser Ala Ser Gly Ser Ser Ser Tyr Leu Ala Val
                85   90   95
Tyr Gly Trp Val Asn Tyr Pro Gln Ala Glu Tyr Tyr Ile Val Glu Asp
            100   105   110
Tyr Gly Asp Tyr Asn Pro Cys Ser Ser Ala Thr Ser Leu Gly Thr Val
        115   120   125
Tyr Ser Asp Gly Ser Thr Tyr Gln Val Cys Thr Asp Thr Arg Thr Asn

    130   135   140
Glu Pro Ser Ile Thr Gly Thr Ser Thr Phe Thr Gln Tyr Phe Ser Val
145   150   155   160
Arg Glu Ser Thr Arg Thr Ser Gly Thr Val Thr Val Ala Asn His Phe
                165   170   175
Asn Phe Trp Ala Gln His Gly Phe Gly Asn Ser Asp Phe Asn Tyr Gln
            180   185   190
Val Met Ala Val Glu Ala Trp Ser Gly Ala Gly Ser Ala Ser Val Thr
        195   200   205
Ile Ser Ser
    210

<210> 10
<211> 330
<212> PRT
<213> Bacillus stearothermophilus

<400> 10
Met Cys Ser Ser Ile Pro Ser Leu Arg Glu Val Phe Ala Asn Asp Phe
 1   5   10   15
Arg Ile Gly Ala Ala Val Asn Pro Val Thr Leu Glu Ala Gln Gln Ser
            20   25   30
Leu Leu Ile Arg His Val Asn Ser Leu Thr Ala Glu Asn His Met Lys
        35   40   45
Phe Glu His Leu Gln Pro Glu Glu Gly Arg Phe Thr Phe Asp Ile Ala
    50   55   60
Ile Lys Ser Ser Thr Ser Pro Phe Ser Ser His Gly Val Arg Gly His
65   70   75   80
Thr Leu Val Trp His Asn Gln Thr Pro Ser Trp Val Phe Gln Asp Ser
                85   90   95
Gln Gly His Phe Val Gly Arg Asp Val Leu Leu Glu Arg Met Lys Ser
            100   105   110
His Ile Ser Thr Val Val Gln Arg Tyr Lys Gly Lys Val Tyr Cys Trp
        115   120   125
Asp Val Ile Asn Glu Ala Val Ala Asp Glu Gly Ser Glu Trp Leu Arg

```
    130                 135                 140
Ser Ser Thr Trp Arg Gln Ile Ile Gly Asp Asp Phe Ile Gln Gln Ala
145                 150                 155                 160
Phe Leu Tyr Ala His Glu Ala Asp Pro Glu Ala Leu Leu Phe Tyr Asn
                165                 170                 175
Asp Tyr Asn Glu Cys Phe Pro Glu Lys Arg Glu Lys Ile Tyr Thr Leu
            180                 185                 190
Val Lys Ser Leu Arg Asp Lys Gly Ile Pro Ile His Gly Ile Gly Met
        195                 200                 205
Gln Ala His Trp Ser Leu Asn Arg Pro Thr Leu Asp Glu Ile Arg Ala
    210                 215                 220
Ala Ile Glu Arg Tyr Ala Ser Leu Gly Val Ile Leu His Ile Thr Glu
225                 230                 235                 240
Leu Asp Ile Ser Met Phe Glu Phe Asp Asp His Arg Lys Asp Leu Ala
                245                 250                 255
Ala Pro Thr Asn Glu Met Val Glu Arg Gln Ala Glu Arg Tyr Glu Gln
            260                 265                 270
Ile Phe Ser Leu Phe Lys Glu Tyr Arg Asp Val Ile Gln Asn Val Thr
        275                 280                 285
Phe Trp Gly Ile Ala Asp Asp His Thr Trp Leu Asp His Phe Pro Val
    290                 295                 300
Gln Gly Arg Lys Asn Trp Pro Leu Leu Phe Asp Glu Gln His Asn Pro
305                 310                 315                 320
Lys Pro Ala Phe Trp Arg Val Val Asn Ile
                325                 330
```

<210> 11
<211> 190
<212> PRT
<213> Trichoderma reesei

<400> 11

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Gln Thr Ile Gln Pro Gly Thr Gly Tyr Asn Asn Gly Tyr Phe Tyr Ser
 1               5                  10                  15
Tyr Trp Asn Asp Gly His Gly Gly Val Thr Tyr Thr Asn Gly Pro Gly
            20                  25                  30
Gly Gln Phe Ser Val Asn Trp Ser Asn Ser Gly Asn Phe Val Gly Gly
        35                  40                  45
Lys Gly Trp Gln Pro Gly Thr Lys Asn Lys Val Ile Asn Phe Ser Gly
    50                  55                  60
Ser Tyr Asn Pro Asn Gly Asn Ser Tyr Leu Ser Val Tyr Gly Trp Ser
65                  70                  75                  80
Arg Asn Pro Leu Ile Glu Tyr Tyr Ile Val Glu Asn Phe Gly Thr Tyr
                85                  90                  95
Asn Pro Ser Thr Gly Ala Thr Lys Leu Gly Glu Val Thr Ser Asp Gly
            100                 105                 110
Ser Val Tyr Asp Ile Tyr Arg Thr Gln Arg Val Asn Gln Pro Ser Ile
        115                 120                 125
Ile Gly Thr Ala Thr Phe Tyr Gln Tyr Trp Ser Val Arg Arg Asn His
    130                 135                 140
Arg Ser Ser Gly Ser Val Asn Thr Ala Asn His Phe Asn Ala Trp Ala
145                 150                 155                 160
Gln Gln Gly Leu Thr Leu Gly Thr Met Asp Tyr Gln Ile Val Ala Val
                165                 170                 175
Glu Gly Tyr Phe Ser Ser Gly Ser Ala Ser Ile Thr Val Ser
            180                 185                 190
```

<210> 12
<211> 237
<212> PRT
<213> Aspergillus awamori

<400> 12
Met Lys Ala Phe His Leu Leu Ala Ala Leu Ser Gly Ala Ala Val Ala
 1   5   10   15
Gln Gln Ala Gln Leu Cys Asp Gln Tyr Ala Thr Tyr Thr Gly Gly Val
            20   25   30
Tyr Thr Ile Asn Asn Asn Leu Trp Gly Lys Asp Ala Gly Ser Gly Ser
        35   40   45
Gln Cys Thr Thr Val Asn Ser Ala Ser Ser Ala Gly Thr Ser Trp Ser
    50   55   60
Thr Lys Trp Asn Trp Ser Gly Gly Glu Asn Ser Val Lys Ser Tyr Ala
65   70   75   80
Asn Ser Gly Leu Ser Phe Asn Lys Lys Leu Val Ser Gln Ile Ser His
                85   90   95
Ile Pro Thr Ala Ala Arg Trp Ser Tyr Asp Asn Thr Cys Ile Arg Arg
            100   105   110
Gly Arg Ala Tyr Asp Leu Phe Thr Ala Ala Asp Ile Asn His Val Thr
        115   120   125
Trp Ser Gly Asp Tyr Glu Leu Met Ile Trp Leu Ala Arg Tyr Gly Gly
    130   135   140
Val Gln Pro Leu Gly Ser Gln Ile Ala Thr Ala Thr Val Glu Gly Gln
145   150   155   160
Thr Trp Glu Leu Trp Tyr Gly Val Asn Gly Ala Gln Lys Thr Tyr Ser
                165   170   175
Phe Val Ala Ala Asn Pro Ile Thr Ser Phe Gln Gly Asp Ile Asn Asp
            180   185   190
Phe Phe Lys Tyr Leu Thr Gln Asn His Gly Phe Pro Ala Ser Ser Gln
        195   200   205
Tyr Leu Ile Thr Leu Gln Phe Gly Thr Glu Pro Phe Thr Gly Gly Pro
    210   215   220
Ala Thr Leu Asn Val Ala Asp Trp Ser Ala Ser Val Gln
225   230   235

<210> 13
<211> 233
<212> PRT
<213> Trichoderma viride

<400> 13
Met Lys Phe Leu Gln Ile Ala Pro Thr Leu Leu Pro Val Ala Leu Ala
 1   5   10   15
Gln Ser Ser Cys Ser Gln Tyr Ala Thr Phe Ser Gly Gly Asn Tyr Ala
            20   25   30
Leu Ser Asn Asn Leu Trp Gly Gln Ser Ala Gly Ser Gly Ser Gly Cys
        35   40   45
Ile Thr Asp Val Ser Leu Gly Gly Ser Ala Val Trp Ser Thr Thr Trp
    50   55   60
Asp Trp Ser Gly Gly Gln Ser Asn Val Lys Gly Tyr Pro Asn Ile Ala
65   70   75   80
Leu Asn Ile Pro Asn Lys Arg Leu Val Ser Ser Ile Ser Ser Met Pro
                85   90   95
Thr Thr Ala Gln Trp Ser Tyr Ser Gly Ser Ser Ile Arg Ala Asp Val

```
            100                 105                 110
Ala Tyr Asp Leu Phe Thr Ala Ser Asn Pro Asn His Val Thr Tyr Ser
        115                 120                 125
Gly Asp Tyr Glu Leu Met Ile Trp Leu Gly Lys Tyr Gly Asp Ile Gln
    130                 135                 140
Pro Ile Gly Ser Ser Gln Gly Thr Val Asn Val Gly Gly Thr Ser Trp
145                 150                 155                 160
Asn Leu Trp Tyr Gly Pro Asn Gly Ser Met Gln Val Tyr Ser Phe Val
                165                 170                 175
Ala Pro Gly Asn Leu Thr Asn Trp Ser Gly Asp Val Lys Asn Phe Tyr
            180                 185                 190
Thr Tyr Leu Gln Asn Asn Lys Gly Tyr Pro Ala Ser Ser Gln Tyr Val
        195                 200                 205
Leu Ser Tyr Gln Phe Gly Thr Glu Ala Phe Thr Gly Ser Gly Thr Leu
    210                 215                 220
Asn Asn Thr Trp Thr Ala Ser Ile Asn
225                 230

<210> 14
<211> 234
<212> PRT
<213> Hypocrea koningii

<400> 14
Met Lys Leu Ile His Val Leu Pro Ala Leu Ile Pro Ala Ala Leu Ala
 1               5                  10                  15
Gln Thr Ser Cys Asp Gln Tyr Ala Val Phe Thr Gly Ser Asp Tyr Thr
            20                  25                  30
Val Ser Asn Asn Leu Trp Gly Gln Ser Ala Gly Ser Gly Phe Gly Cys
        35                  40                  45
Val Thr Ala Glu Ser Leu Ser Gly Ser Ala Ser Trp His Ala Asp Trp
    50                  55                  60
Gln Trp Ser Gly Gly Gln Asn Asn Val Lys Ser Tyr Gln Asn Ser Gln
65                  70                  75                  80
Ile Pro Ile Pro Gln Lys Arg Thr Val Asn Ser Ile Ser Ser Met Pro
                85                  90                  95
Thr Thr Ala Ser Trp Ser Tyr Thr Gly Ser Asp Ile Arg Ala Asn Val
            100                 105                 110
Ala Tyr Asp Leu Phe Thr Ala Ala Asn Pro Asn His Val Thr Tyr Ser
        115                 120                 125
Gly Asp Tyr Glu Leu Met Ile Trp Leu Gly Arg Tyr Gly Asp Ile Gly
    130                 135                 140
Pro Ile Gly Ser Ser Gln Gly Thr Val Asn Val Gly Gly Gln Ser Trp
145                 150                 155                 160
Thr Leu Tyr Tyr Gly Tyr Asn Gly Ala Met Gln Val Tyr Ser Phe Val
                165                 170                 175
Ala Gln Thr Asn Thr Thr Ser Tyr Ser Gly Asp Val Lys Asn Phe Phe
            180                 185                 190
Asn Tyr Leu Arg Asp Asn Lys Gly Tyr Asn Ala Ala Gly Gln Tyr Val
        195                 200                 205
Leu Ser Tyr Gln Phe Gly Thr Glu Pro Phe Thr Gly Ser Gly Thr Leu
    210                 215                 220
Asn Val Ala Ser Trp Thr Ala Ser Ile Asn
225                 230

<210> 15
<211> 234
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<212> PRT
<213> Hypocrea schweinitzii

<400> 15
Met Lys Phe Leu Gln Val Leu Pro Ala Ile Leu Pro Ala Ala Leu Ala
 1   5   10   15
Gln Thr Ser Cys Asp Gln Tyr Ala Thr Phe Ser Gly Asn Gly Tyr Ile
            20   25   30
Val Ser Asn Asn Leu Trp Gly Ala Ser Ala Gly Ser Gly Phe Gly Cys
        35   40   45
Val Thr Ser Val Ser Leu Asn Gly Ala Ala Ser Trp His Ala Asp Trp
    50   55   60
Gln Trp Ser Gly Gly Gln Asn Asn Val Lys Ser Tyr Gln Asn Val Gln
65   70   75   80
Ile Asn Ile Pro Gln Lys Arg Thr Val Asn Ser Ile Gly Ser Met Pro
                85   90   95
Thr Thr Ala Ser Trp Ser Tyr Ser Gly Ser Asp Ile Arg Ala Asn Val
            100   105   110
Ala Tyr Asp Leu Phe Thr Ala Ala Asn Pro Asn His Val Thr Tyr Ser
        115   120   125
Gly Asp Tyr Glu Leu Met Ile Trp Leu Gly Lys Tyr Gly Asp Ile Gly
    130   135   140
Pro Ile Gly Ser Ser Gln Gly Thr Val Asn Val Gly Gly Gln Thr Trp
145   150   155   160
Thr Leu Tyr Tyr Gly Tyr Asn Gly Ala Met Gln Val Tyr Ser Phe Val
                165   170   175
Ala Gln Ser Asn Thr Thr Ser Tyr Ser Gly Asp Val Lys Asn Phe Phe
            180   185   190
Asn Tyr Leu Arg Asp Asn Lys Gly Tyr Asn Ala Gly Gly Gln Tyr Val
        195   200   205
Leu Ser Tyr Gln Phe Gly Thr Glu Pro Phe Thr Gly Ser Gly Thr Leu
    210   215   220
Asn Val Ala Ser Trp Thr Ala Ser Ile Asn
225   230

<210> 16
<211> 237
<212> PRT
<213> Stachybotrys echinata

<400> 16
Met Lys Val Ala Ala Leu Leu Val Ala Leu Ser Pro Leu Ala Phe Ala
 1   5   10   15
Gln Ser Leu Cys Asp Gln Tyr Ser Tyr Tyr Ser Ser Asn Gly Tyr Glu
            20   25   30
Phe Asn Asn Asn Met Trp Gly Arg Asn Ser Gly Gln Gly Asn Gln Cys
        35   40   45
Thr Tyr Val Asp Tyr Ser Ser Pro Asn Gly Val Gly Trp Arg Val Asn
    50   55   60
Trp Asn Trp Ser Gly Gly Asp Asn Asn Val Lys Ser Tyr Pro Tyr Ser
65   70   75   80
Gly Arg Gln Leu Pro Thr Lys Arg Ile Val Ser Trp Ile Gly Ser Leu
                85   90   95
Pro Thr Thr Val Ser Trp Asn Tyr Gln Gly Asn Asn Leu Arg Ala Asn
            100   105   110
Val Ala Tyr Asp Leu Phe Thr Ala Ala Asn Pro Asn His Pro Asn Ser
        115   120   125

```
Ser Gly Asp Tyr Glu Leu Met Ile Trp Leu Gly Arg Leu Gly Asn Val
    130                 135                 140
Tyr Pro Ile Gly Asn Gln Val Ala Thr Val Asn Ile Ala Gly Gln Gln
145                 150                 155                 160
Trp Asn Leu Tyr Tyr Gly Tyr Asn Gly Ala Met Gln Val Tyr Ser Phe
                165                 170                 175
Val Ser Pro Asn Gln Leu Asn Tyr Phe Ser Gly Asn Val Lys Asp Phe
            180                 185                 190
Phe Thr Tyr Leu Gln Tyr Asn Arg Ala Tyr Pro Ala Asp Ser Gln Tyr
        195                 200                 205
Leu Ile Thr Tyr Gln Phe Gly Thr Glu Pro Phe Thr Gly Gln Asn Ala
    210                 215                 220
Val Phe Thr Val Ser Asn Trp Ser Ala Gln Gln Asn Asn
225                 230                 235
```

<210> 17
<211> 238
<212> PRT
<213> Fusarium equiseti

<400> 17

```
Met Lys Ser Thr Leu Leu Leu Ala Gly Ala Phe Ala Pro Leu Ala Phe
 1                5                  10                  15
Ala Lys Asp Leu Cys Glu Gln Tyr Gly Tyr Leu Ser Ser Asp Gly Tyr
            20                  25                  30
Ser Leu Asn Asn Asn Val Trp Gly Lys Asp Ser Gly Thr Gly Asp Gln
        35                  40                  45
Cys Thr His Val Asn Trp Asn Asn Ala Asn Gly Ala Gly Trp Asp Val
    50                  55                  60
Glu Trp Asn Trp Ser Gly Gly Lys Asp Asn Val Lys Ser Tyr Pro Asn
65                  70                  75                  80

Ser Ala Leu Leu Ile Gly Glu Asp Lys Lys Thr Ile Ser Ser Ile Thr
                85                  90                  95
Asn Met Gln Ser Thr Ala Glu Trp Lys Tyr Ser Gly Asp Asn Leu Arg
            100                 105                 110
Ala Asp Val Ala Tyr Asp Leu Phe Thr Ala Ala Asp Pro Asn His Glu
        115                 120                 125
Thr Ser Ser Gly Glu Tyr Glu Leu Met Val Trp Leu Ala Arg Ile Gly
    130                 135                 140
Gly Val Gln Pro Ile Gly Ser Leu Gln Thr Ser Val Thr Ile Glu Gly
145                 150                 155                 160
His Thr Trp Glu Leu Trp Val Gly Met Asn Gly Ser Met Lys Val Phe
                165                 170                 175
Ser Phe Val Ala Pro Thr Pro Val Asn Asn Phe Asn Ala Asp Ile Lys
            180                 185                 190
Gln Phe Trp Asp Tyr Leu Thr Lys Ser Gln Asn Phe Pro Ala Asp Asn
        195                 200                 205
Gln Tyr Leu Leu Thr Phe Gln Phe Gly Thr Glu Pro Phe Thr Gly Asp
    210                 215                 220
Asn Ala Lys Phe Thr Val Thr Asn Phe Asn Ala His Leu Lys
225                 230                 235
```

<210> 18
<211> 237
<212> PRT
<213> Bionectria ochroleuca

<400> 18
Met Lys Thr Gly Ile Ala Tyr Leu Ala Ala Val Leu Pro Leu Ala Met
 1   5   10   15
Ala Glu Ser Leu Cys Asp Gln Tyr Ala Tyr Leu Ser Arg Asp Gly Tyr
            20   25   30
Asn Phe Asn Asn Asn Glu Trp Gly Ala Ala Thr Gly Thr Gly Asp Gln
        35   40   45
Cys Thr Tyr Val Asp Ser Thr Ser Ser Gly Gly Val Ser Trp His Ser
    50   55   60
Asp Trp Thr Asn Ser Gly Ser Glu Ser Glu Ile Lys Ser Tyr Pro Tyr
65   70   75   80
Ser Gly Leu Asp Leu Pro Glu Lys Lys Ile Val Thr Ser Ile Gly Ser
                85   90   95
Ile Ser Thr Gly Ala Glu Trp Ser Tyr Ser Gly Ser Asn Ile Arg Ala
            100   105   110
Asp Val Ala Tyr Asp Ile Phe Thr Ala Ala Asp Pro Asn His Ala Thr
        115   120   125
Ser Ser Gly Asp Tyr Glu Val Met Ile Trp Leu Ala Asn Leu Gly Gly
    130   135   140
Leu Thr Pro Ile Gly Ser Pro Ile Gly Thr Val Lys Ala Ala Gly Arg
145   150   155   160
Asp Trp Glu Leu Trp Asp Gly Tyr Asn Gly Ala Met Arg Val Tyr Ser
                165   170   175
Phe Val Ala Pro Ser Gln Leu Asn Ser Phe Asp Gly Glu Ile Met Asp
            180   185   190
Phe Phe Tyr Val Val Lys Asp Met Arg Gly Phe Pro Ala Asp Ser Gln
        195   200   205
His Leu Leu Thr Val Gln Phe Gly Thr Glu Pro Ile Ser Gly Ser Gly
    210   215   220
Ala Lys Phe Ser Val Ser His Trp Ser Ala Lys Leu Gly
225   230   235

<210> 19
<211> 236
<212> PRT
<213> Bionectria ochroleuca

<400> 19
Met Lys Phe Gln Leu Leu Ser Leu Thr Ala Phe Ala Pro Leu Ser Leu
 1   5   10   15
Ala Ala Leu Cys Gly Gln Tyr Gln Ser Gln Ser Gln Gly Gly Tyr Ile
            20   25   30
Phe Asn Asn Asn Lys Trp Gly Gln Gly Ser Gly Ser Gly Ser Gln Cys
        35   40   45
Leu Thr Ile Asp Lys Thr Trp Asp Ser Asn Val Ala Phe His Ala Asp
    50   55   60
Trp Ser Trp Ser Gly Gly Thr Asn Asn Val Lys Ser Tyr Pro Asn Ala
65   70   75   80
Gly Leu Glu Phe Ser Arg Gly Lys Lys Val Ser Ser Ile Gly Thr Ile
                85   90   95
Asn Gly Gly Ala Asp Trp Asp Tyr Ser Gly Ser Asn Ile Arg Ala Asn
            100   105   110
Val Ala Tyr Asp Ile Phe Thr Ser Ala Asp Pro Asn His Val Thr Ser
        115   120   125
Ser Gly Asp Tyr Glu Leu Met Ile Trp Leu Gly Lys Leu Gly Asp Ile
    130   135   140

```
Tyr Pro Ile Gly Asn Ser Ile Gly Arg Val Lys Ala Ala Asn Arg Glu
145                 150                 155                 160
Trp Asp Leu His Val Gly Tyr Asn Gly Ala Met Lys Val Phe Ser Phe
                165                 170                 175
Val Ala Pro Ser Pro Val Thr Arg Phe Asp Gly Asn Ile Met Asp Phe
            180                 185                 190
Phe Tyr Val Met Arg Asp Met Gln Gly Tyr Pro Met Asp Lys Gln Tyr
        195                 200                 205
Leu Leu Thr Leu Gln Phe Gly Thr Glu Pro Phe Thr Gly Ser Asn Ala
    210                 215                 220
Lys Phe Ser Cys Trp Tyr Phe Gly Ala Lys Ile Lys
225                 230                 235

<210> 20
<211> 240
<212> PRT
<213> Bionectria ochroleuca

<400> 20
Met Lys Ala Asn Ile Val Ile Leu Ser Leu Phe Ala Pro Leu Ala Ala
 1               5                  10                  15
Val Ala Gln Thr Leu Cys Gly Gln Tyr Ser Ser Asn Thr Gln Gly Gly
            20                  25                  30
Tyr Ile Phe Asn Asn Asn Met Trp Gly Met Gly Ser Gly Ser Gly Ser
        35                  40                  45
Gln Cys Thr Tyr Val Asp Lys Val Trp Ala Glu Gly Val Ala Trp His
    50                  55                  60
Thr Asp Trp Ser Trp Ser Gly Gly Asp Asn Asn Val Lys Ser Tyr Pro
65                  70                  75                  80
Tyr Ser Gly Arg Glu Leu Gly Thr Lys Arg Ile Val Ser Ser Ile Lys
                85                  90                  95
Ser Ile Ser Ser Gly Ala Asp Trp Asp Tyr Thr Gly Ser Asn Leu Arg
            100                 105                 110
Ala Asn Ala Ala Tyr Asp Ile Phe Thr Ser Ala Asn Pro Asn His Ala
        115                 120                 125
Thr Ser Ser Gly Asp Tyr Glu Val Met Ile Trp Leu Gly Arg Tyr Gly
    130                 135                 140
Gly Val Tyr Pro Ile Gly Asn Ser Ile Gly Thr Val Arg Ala Ala Gly
145                 150                 155                 160
Arg Asp Trp Ala Leu His Ile Gly Tyr Asn Gly Ala Met Lys Val Phe
                165                 170                 175
Ser Phe Val Ala Ala Asn Pro Val Thr Arg Phe Asp Gly Glu Ile Met
            180                 185                 190
Asp Phe Phe Tyr Leu Leu Arg Asp Met Gln Gly Tyr Pro Met Thr Ser
        195                 200                 205
Gln Tyr Leu Leu Thr Leu Gln Phe Gly Thr Glu Pro Phe Thr Gly Ser
    210                 215                 220
Gly Ala Lys Phe Asn Cys Trp Tyr Phe Gly Ala Thr Leu Ser Tyr Trp
225                 230                 235                 240

<210> 21
<211> 254
<212> PRT
<213> Humicola grisea

<400> 21
Met Leu Lys Ser Ala Leu Leu Leu Gly Ala Ala Ala Val Ser Val Gln
```

```
 1               5                  10                  15
Ser Ala Ser Ile Pro Thr Ile Pro Ala Asn Leu Glu Pro Arg Gln Ile
            20                  25                  30
Arg Ser Leu Cys Glu Leu Tyr Gly Tyr Trp Ser Gly Asn Gly Tyr Glu
        35                  40                  45
Leu Leu Asn Asn Leu Trp Gly Lys Asp Thr Ala Thr Ser Gly Trp Gln
    50                  55                  60
Cys Thr Tyr Leu Asp Gly Thr Asn Asn Gly Gly Ile Gln Trp Asn Thr
65                  70                  75                  80
Ala Trp Glu Trp Gln Gly Ala Pro Asp Asn Val Lys Asn Tyr Pro Tyr
                85                  90                  95
Val Gly Lys Gln Ile Gln Arg Gly Arg Lys Ile Ser Asp Ile Asn Ser
            100                 105                 110
Met Arg Thr Ser Val Ser Trp Thr Tyr Asp Arg Thr Asp Leu Arg Ala
        115                 120                 125
Asn Val Ala Tyr Asp Val Phe Thr Ala Arg Asp Pro Asp His Pro Asn
    130                 135                 140
Trp Gly Gly Asp Tyr Glu Leu Met Ile Trp Leu Ala Arg Tyr Gly Gly
145                 150                 155                 160
Ile Tyr Pro Ile Gly Thr Phe His Ser Gln Val Asn Leu Ala Gly Arg
                165                 170                 175
Thr Trp Asp Leu Trp Thr Gly Tyr Asn Gly Asn Met Arg Val Tyr Ser
            180                 185                 190
Phe Leu Pro Pro Ser Gly Asp Ile Arg Asp Phe Ser Cys Asp Ile Lys
        195                 200                 205
Asp Phe Phe Asn Tyr Leu Glu Arg Asn His Gly Tyr Pro Ala Arg Glu
    210                 215                 220
Gln Asn Leu Ile Val Tyr Gln Val Gly Thr Glu Cys Phe Thr Gly Gly
225                 230                 235                 240
Pro Ala Arg Phe Thr Cys Arg Asp Phe Arg Ala Asp Leu Trp
                245                 250
```

<210> 22
<211> 247
<212> PRT
<213> Chaetomium brasiliense

<400> 22

```
Met Lys Leu Thr Leu Val Leu Phe Val Ser Ser Leu Ala Ala Ala Thr
 1               5                  10                  15
Pro Leu Gly Trp Arg Glu Arg Arg Gln Gln Val Ser Leu Cys Gly Gln
            20                  25                  30
Ser Ser Ser Trp Ser Gly Asn Gly Tyr Gln Leu Asn Asn Asn Leu Trp
        35                  40                  45
Gly Gln Ser Arg Ala Thr Ser Gly Ser Gln Cys Thr Tyr Leu Asp Ser
    50                  55                  60
Ser Ser Asn Ser Gly Ile His Trp His Thr Thr Trp Thr Trp Glu Gly
65                  70                  75                  80
Gly Glu Gly Glu Val Lys Ser Tyr Ala Tyr Ser Gly Arg Gln Val Ser
                85                  90                  95
Thr Gly Leu Thr Ile Ala Ser Ile Asp Ser Met Gln Thr Ser Val Ser
            100                 105                 110
Trp Glu Tyr Asn Thr Thr Asp Ile Gln Ala Asn Val Ala Tyr Asp Ile
        115                 120                 125
Phe Thr Ala Glu Asp Pro Asp His Glu His Ser Ser Gly Asp Tyr Glu
    130                 135                 140
Val Met Ile Trp Leu Ala Arg Tyr Asn Asn Val Ser Pro Ile Gly Ser
```

```
145                 150                 155                 160
Ser Val Ala Thr Ala Thr Val Gly Gly Asp Thr Trp Asp Leu Phe Ala
                165                 170                 175
Gly Ala Asn Gly Asp Met Glu Val Tyr Ser Phe Val Ala Glu Asn Thr
            180                 185                 190
Met Asn Ser Phe Ser Gly Asp Val Lys Asp Phe Phe Asp Tyr Leu Glu
        195                 200                 205
Gln Asn Val Gly Phe Pro Val Asp Asp Gln Tyr Leu Leu Val Phe Glu
    210                 215                 220
Leu Gly Ser Glu Ala Phe Thr Gly Gly Pro Ala Thr Leu Ser Val Ser
225                 230                 235                 240
Gln Phe Ser Ala Asn Ile Ala
                245
```

<210> 23
<211> 357
<212> PRT
<213> Bionectria ochroleuca

<400> 23

```
Met Lys Ser Ile Ile Ser Phe Phe Gly Leu Ala Thr Leu Val Ala Ala
 1               5                  10                  15
Ala Pro Ser Gln Asn Pro Thr Arg Thr Gln Pro Leu Glu Lys Arg Ala
            20                  25                  30
Thr Thr Leu Cys Gly Gln Trp Asp Ser Val Glu Thr Gly Gly Tyr Thr
        35                  40                  45
Ile Tyr Asn Asn Leu Trp Gly Gln Asp Asn Gly Ser Gly Ser Gln Cys
    50                  55                  60
Leu Thr Val Glu Gly Val Thr Asp Gly Leu Ala Ala Trp Ser Ser Thr
65                  70                  75                  80
Trp Ser Trp Ser Gly Gly Ser Ser Ser Val Lys Ser Tyr Ser Asn Ala
                85                  90                  95
Val Leu Ser Ala Glu Ala Ala Arg Ile Ser Ala Ile Ser Ser Ile Pro
            100                 105                 110
Ser Lys Trp Glu Trp Ser Tyr Thr Gly Thr Asp Ile Val Ala Asn Val
        115                 120                 125
Ala Tyr Asp Leu Phe Ser Asn Thr Asp Cys Gly Asp Thr Pro Glu Tyr
    130                 135                 140
Glu Ile Met Ile Trp Leu Ser Ala Leu Gly Gly Ala Gly Pro Ile Ser
145                 150                 155                 160
Ser Thr Gly Ser Ser Ile Ala Thr Val Thr Ile Ala Gly Ala Ser Trp
                165                 170                 175
Asn Leu Trp Gln Gly Gln Asn Asn Gln Met Thr Val Phe Ser Phe Val
            180                 185                 190
Ala Glu Ser Asp Gln Lys Ser Phe Ser Gly Asp Leu Asn Asp Phe Ile
        195                 200                 205
Gln Tyr Leu Val Asp Ser Gln Gly Tyr Ser Gly Ser Gln Cys Leu Tyr
    210                 215                 220
Ser Ile Gly Ala Gly Thr Glu Pro Phe Thr Gly Thr Asp Ala Glu Phe
225                 230                 235                 240
Ile Thr Thr Gly Tyr Ser Val Ser Val Ser Ala Gly Asp Ser Gly Ser
                245                 250                 255
Asp Glu Thr Thr Thr Ser Ser Gln Ala Gln Ser Ser Thr Val Glu Thr
            260                 265                 270
Ser Thr Ala Thr Gln Pro Gln Ser Ser Ser Thr Val Val Pro Thr Val
        275                 280                 285
```

```
Thr Leu Ser Gln Pro Ser Asn Glu Ser Thr Thr Thr Pro Val Gln Ser
    290                 295                 300
Gln Pro Ser Ser Val Glu Thr Thr Pro Thr Ala Gln Pro Gln Ser Ser
305                 310                 315                 320
Ser Val Gln Thr Thr Thr Thr Ala Gln Ala Gln Pro Thr Pro Glu Arg
                325                 330                 335
Ala Ala Pro Asp Ala Gly Ser Ala Glu Leu Leu Ser Ser Ala Thr Met
            340                 345                 350
His Leu Asp Arg Arg
        355
```

<210> 24
<211> 247
<212> PRT
<213> Emericella desertorum

<400> 24

```
Met Lys Leu Leu Ala Leu Ser Leu Val Ser Leu Ala Ser Ala Ala Ser
 1                5                  10                  15
Ala Ala Ser Ile Leu Ser Asn Thr Phe Thr Arg Arg Ser Asp Phe Cys
            20                  25                  30
Gly Gln Trp Asp Thr Ala Thr Val Gly Asn Phe Ile Val Tyr Asn Asn
        35                  40                  45
Leu Trp Gly Gln Asp Asn Ala Asp Ser Gly Ser Gln Cys Thr Gly Val
    50                  55                  60
Asp Ser Ala Asn Gly Asn Ser Ile Ser Trp His Thr Thr Trp Ser Trp
65                  70                  75                  80
Ser Gly Gly Ser Ser Ser Val Lys Ser Tyr Ala Asn Ala Ala Tyr Gln
                85                  90                  95
Phe Thr Ser Thr Lys Leu Asn Ser Leu Ser Ser Ile Pro Thr Ser Trp
            100                 105                 110
Lys Trp Gln Tyr Ser Thr Thr Asp Ile Val Ala Asn Val Ala Tyr Asp
        115                 120                 125
Leu Phe Thr Ser Ser Ser Ala Gly Gly Asp Ser Glu Tyr Glu Ile Met
    130                 135                 140
Ile Trp Leu Ala Ala Leu Gly Gly Ala Gly Pro Ile Ser Ser Thr Gly
145                 150                 155                 160
Ser Ser Ile Ala Thr Val Thr Leu Gly Gly Val Thr Trp Ser Leu Tyr
                165                 170                 175
Ser Gly Pro Asn Gly Ser Met Gln Val Tyr Ser Phe Val Ala Ser Ser
            180                 185                 190
Thr Thr Glu Ser Phe Ser Ala Asp Leu Met Asp Phe Ile Asn Tyr Leu
        195                 200                 205
Ala Glu Asn Gln Gly Leu Ser Ser Ser Gln Tyr Leu Thr His Val Gln
    210                 215                 220
Ala Gly Thr Glu Pro Phe Thr Gly Thr Asp Ala Thr Leu Thr Val Ser
225                 230                 235                 240
Ser Tyr Ser Val Ser Val Ser
                245
```

<210> 25
<211> 244
<212> PRT
<213> Fusarium solani

<400> 25

```
Met Lys Ser Ala Ile Val Ala Ala Leu Ala Gly Leu Ala Ala Ala Ser
```

```
 1               5                  10                  15
Pro Thr Arg Leu Ile Pro Arg Gly Gln Phe Cys Gly Gln Trp Asp Ser
            20                  25                  30
Glu Thr Ala Gly Ala Tyr Thr Ile Tyr Asn Asn Leu Trp Gly Lys Asp
        35                  40                  45
Asn Ala Glu Ser Gly Glu Gln Cys Thr Thr Asn Ser Gly Glu Gln Ser
    50                  55                  60
Asp Gly Ser Ile Ala Trp Ser Val Glu Trp Ser Trp Thr Gly Gly Gln
65                  70                  75                  80
Gly Gln Val Lys Ser Tyr Pro Asn Ala Val Val Glu Ile Glu Lys Lys
                85                  90                  95
Thr Leu Gly Glu Val Ser Ser Ile Pro Ser Ala Trp Asp Trp Thr Tyr
            100                 105                 110
Thr Gly Asn Gly Ile Ile Ala Asn Val Ala Tyr Asp Leu Phe Thr Ser
        115                 120                 125
Ser Thr Glu Ser Gly Asp Ala Glu Tyr Glu Phe Met Ile Trp Leu Ser
    130                 135                 140
Ala Leu Gly Gly Ala Gly Pro Ile Ser Asn Asp Gly Ser Pro Val Ala
145                 150                 155                 160
Thr Val Glu Leu Ala Gly Thr Ser Trp Lys Leu Tyr Gln Gly Lys Asn
                165                 170                 175
Asn Gln Met Thr Val Phe Ser Phe Val Ala Glu Ser Asp Val Asn Asn
            180                 185                 190
Phe Cys Gly Asp Leu Ala Asp Phe Thr Asp Tyr Leu Val Asp Asn His
        195                 200                 205
Gly Val Ser Ser Ser Gln Ile Leu Gln Ser Val Gly Ala Gly Thr Glu
    210                 215                 220
Pro Phe Glu Gly Thr Asn Ala Val Phe Thr Thr Asn Asn Tyr His Ala
225                 230                 235                 240
Asp Val Glu Tyr
```

<210> 26
<211> 250
<212> PRT
<213> Fusarium solani

<400> 26

```
Met Lys Phe Phe Gly Val Val Ser Ala Phe Leu Ala Ala Thr Ala Val
 1               5                  10                  15
Ala Thr Pro Thr Thr Pro Thr Glu Thr Ile Glu Lys Arg Asp Thr Thr
            20                  25                  30
Trp Cys Asp Ala Phe Gly Ser Leu Ala Thr Ser Gly Tyr Thr Val Tyr
        35                  40                  45
His Asn Asn Trp Gly Lys Gly Asp Ala Thr Ser Gly Ser Gln Cys Thr
    50                  55                  60
Thr Phe Thr Ser Val Ser Asn Asn Asn Phe Val Trp Ser Thr Ser Trp
65                  70                  75                  80
Thr Trp Ala Gly Gly Ala Gly Lys Val Lys Ser Tyr Ser Asn Val Ala
                85                  90                  95
Leu Glu Lys Ile Asn Lys Lys Ile Ser Asp Ile Lys Ser Val Ser Thr
            100                 105                 110
Arg Trp Ile Trp Arg Tyr Thr Gly Thr Lys Met Ile Ala Asn Val Ser
        115                 120                 125
Tyr Asp Leu Trp Phe Ala Pro Thr Ala Ser Ser Asn Asn Ala Tyr Glu
    130                 135                 140
Ile Met Ile Trp Val Gly Ala Tyr Gly Gly Ala Leu Pro Ile Ser Thr
145                 150                 155                 160
```

```
Pro Gly Lys Gly Val Ile Asp Arg Pro Thr Leu Ala Gly Ile Pro Trp
                165                 170                 175
Asp Val Tyr Lys Gly Pro Asn Gly Asp Val Thr Val Ile Ser Phe Val
            180                 185                 190
Ala Ser Ser Asn Gln Gly Asn Phe Gln Ala Asp Leu Lys Glu Phe Leu
        195                 200                 205
Asn Tyr Leu Thr Ser Lys Gln Gly Leu Pro Ser Asn Tyr Val Ala Thr
    210                 215                 220
Ser Phe Gln Ala Gly Thr Glu Pro Phe Glu Gly Thr Asn Ala Val Leu
225                 230                 235                 240
Lys Thr Ser Ala Tyr Thr Ile Ser Val Asn
                245                 250
```

<210> 27
<211> 371
<212> PRT
<213> Streptomyces sp. 11AG8

<400> 27

```
Met Arg Ser His Pro Arg Ser Ala Thr Met Thr Val Leu Val Val Leu
 1               5                  10                  15
Ala Ser Leu Gly Ala Leu Leu Thr Ala Ala Ala Pro Ala Gln Ala Asn
            20                  25                  30
Gln Gln Ile Cys Asp Arg Tyr Gly Thr Thr Thr Ile Gln Asp Arg Tyr
        35                  40                  45
Val Val Gln Asn Asn Arg Trp Gly Thr Ser Ala Thr Gln Cys Ile Asn
    50                  55                  60
Val Thr Gly Asn Gly Phe Glu Ile Thr Gln Ala Asp Gly Ser Val Pro
65                  70                  75                  80
Thr Asn Gly Ala Pro Lys Ser Tyr Pro Ser Val Tyr Asp Gly Cys His
                85                  90                  95
Tyr Gly Asn Cys Ala Pro Arg Thr Thr Leu Pro Met Arg Ile Ser Ser
            100                 105                 110
Ile Gly Ser Ala Pro Ser Ser Val Ser Tyr Arg Tyr Thr Gly Asn Gly
        115                 120                 125
Val Tyr Asn Ala Ala Tyr Asp Ile Trp Leu Asp Pro Thr Pro Arg Thr
    130                 135                 140
Asn Gly Val Asn Arg Thr Glu Ile Met Ile Trp Phe Asn Arg Val Gly
145                 150                 155                 160
Pro Val Gln Pro Ile Gly Ser Pro Val Gly Thr Ala His Val Gly Gly
                165                 170                 175
Arg Ser Trp Glu Val Trp Thr Gly Ser Asn Gly Ser Asn Asp Val Ile
            180                 185                 190
Ser Phe Leu Ala Pro Ser Ala Ile Ser Ser Trp Ser Phe Asp Val Lys
        195                 200                 205
Asp Phe Val Asp Gln Ala Val Ser His Gly Leu Ala Thr Pro Asp Trp
    210                 215                 220
Tyr Leu Thr Ser Ile Gln Ala Gly Phe Glu Pro Trp Glu Gly Gly Thr
225                 230                 235                 240
Gly Leu Ala Val Asn Ser Phe Ser Ser Ala Val Asn Ala Gly Gly Gly
                245                 250                 255
Asn Gly Gly Thr Pro Gly Thr Pro Ala Ala Cys Gln Val Ser Tyr Ser
            260                 265                 270
Thr His Thr Trp Pro Gly Gly Phe Thr Val Asp Thr Thr Ile Thr Asn
        275                 280                 285
Thr Gly Ser Thr Pro Val Asp Gly Trp Glu Leu Asp Phe Thr Leu Pro
    290                 295                 300
```

```
Ala Gly His Thr Val Thr Ser Val Trp Asn Ala Leu Ile Ser Pro Ala
305                 310                 315                 320
Ser Gly Ala Val Thr Ala Arg Ser Thr Gly Ser Asn Gly Arg Ile Ala
                325                 330                 335
Ala Asn Gly Gly Thr Gln Ser Phe Gly Phe Gln Gly Thr Ser Ser Gly
            340                 345                 350
Ala Gly Phe Thr Ala Pro Ala Gly Ala Arg Leu Asn Gly Thr Ser Cys
        355                 360                 365
Thr Val Arg
    370
```

<210> 28
<211> 221
<212> PRT
<213> Artificial Sequence

<220>
<223> consensus sequence

<220>
<221> VARIANT
<222> (1)...(221)
<223> Xaa = Any Amino Acid

<400> 28

```
Cys Xaa Gln Tyr Xaa Xaa Xaa Xaa Xaa Xaa Gly Tyr Xaa Xaa Xaa Asn
 1               5                  10                  15
Asn Xaa Trp Gly Xaa Xaa Xaa Xaa Xaa Ser Gly Xaa Gln Cys Thr Xaa
            20                  25                  30
Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Trp Xaa Xaa Xaa Trp
        35                  40                  45
Xaa Trp Ser Gly Gly Xaa Xaa Xaa Val Lys Ser Tyr Xaa Xaa Xaa Xaa
    50                  55                  60
Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Ser Xaa Ile Xaa Ser Xaa
65                  70                  75                  80
Xaa Xaa Xaa Xaa Xaa Trp Xaa Tyr Xaa Gly Xaa Xaa Xaa Xaa Ala Asn
                85                  90                  95
Val Ala Tyr Asp Leu Phe Thr Xaa Xaa Xaa Pro Xaa His Xaa Xaa Xaa
            100                 105                 110
Xaa Gly Xaa Tyr Glu Xaa Met Ile Trp Leu Xaa Xaa Xaa Gly Gly Xaa
        115                 120                 125
Xaa Pro Ile Gly Ser Xaa Xaa Xaa Xaa Val Xaa Xaa Xaa Xaa Xaa Xaa
    130                 135                 140
Gly Xaa Xaa Trp Xaa Leu Xaa Xaa Gly Xaa Asn Gly Xaa Met Xaa Val
145                 150                 155                 160
Xaa Ser Phe Val Ala Xaa Ser Ser Ser Ser Ser Ser Phe Xaa Gly Asp
                165                 170                 175
Xaa Xaa Xaa Phe Xaa Xaa Tyr Leu Xaa Xaa Xaa Xaa Gly Xaa Pro Xaa
            180                 185                 190
Xaa Xaa Gln Tyr Leu Xaa Xaa Xaa Gln Xaa Gly Thr Glu Pro Phe Thr
        195                 200                 205
Gly Xaa Xaa Ala Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Ala
    210                 215                 220
```

<210> 29
<211> 25
<212> DNA

<213> Artificial Sequence

<220>
<223> synthetic oligonucleotide

<400> 29
gaacgatggc aagggcggcg tgacg 25

<210> 30
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> synthetic oligonucleotide

<400> 30
cttctcgggc tgctacaacc caaacgg 27

<210> 31
<211> 26
<212> DNA
<213> Artificial Sequence

<220>
<223> synthetic oligonucleotide

<400> 31
acatcgtcga gtgttttggc acctac 26

<210> 32
<211> 29
<212> DNA
<213> Artificial Sequence

<220>
<223> synthetic oligonucleotide

<400> 32
catcgtcgag aactggggca cctacaacc 29

<210> 33
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> synthetic oligonucleotide

<400> 33
ggcacctacc gaccgtccac g 21

<210> 34
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
<223> synthetic oligonucleotide

<400> 34
caagctgggc gagcacacct ccgac 25

<210> 35
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> synthetic oligonucleotide

<400> 35
cgccgcaact gtcgctcgag c 21

<210> 36
<211> 29
<212> DNA
<213> Artificial Sequence

<220>
<223> synthetic oligonucleotide

<400> 36
gtggagggtt accaaagctc tggctctgc 29

<210> 37
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> synthetic oligonucleotide

<400> 37
tctggctctg cttgcatcac cgtcagc 27

<210> 38
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> synthetic oligonucleotide

<400> 38
gagaagcgcc agtgcattca gcccggc 27

<210> 39
<211> 27
<212> DNA
<213> Artificial Sequence

<220>

<223> synthetic oligonucleotide

<400> 39
gtgacgtact gcaatggtcc cggcggg 27

<210> 40
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> synthetic oligonucleotide

<400> 40
ggcaccaaga acagggtcat caacttctcg ggc 33

<210> 41
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> synthetic oligonucleotide

<400> 41
tccatcaccg tcagcgatta aaggggctc ttc 33

<210> 42
<211> 32
<212> DNA
<213> Artificial Sequence

<220>
<223> synthetic oligonucleotide

<400> 42
cccagacgat tcagtgcggc acgggctaca ac 32

<210> 43
<211> 32
<212> DNA
<213> Artificial Sequence

<220>
<223> synthetic oligonucleotide

<400> 43
cttctactcg tactggtgcg atggccacgg cg 32

<210> 44
<211> 32
<212> DNA
<213> Artificial Sequence

<220>
<223> synthetic oligonucleotide

<400> 44
cgattcagcc cggctgcggc tacaacaacg gc 32

<210> 45
<211> 35
<212> DNA
<213> Artificial Sequence

<220>
<223> synthetic oligonucleotide

<400> 45
caacggctac ttctactgct actggaacga tggcc 35

<210> 46
<211> 34
<212> DNA
<213> Artificial Sequence

<220>
<223> synthetic oligonucleotide

<400> 46
ccggcacggg ctactgcaac ggctacttct actc 34

<210> 47
<211> 31
<212> DNA
<213> Artificial Sequence

<220>
<223> synthetic oligonucleotide

<400> 47
ggcgtgacgt acacctgcgg tcccggcggg c 31

<210> 48
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> synthetic oligonucleotide

<400> 48
ggcgccacca agtgcggcga ggtcacc 27

<210> 49
<211> 28
<212> DNA
<213> Artificial Sequence

<220>
<223> synthetic oligonucleotide

<400> 49

gcgtgggctc agtgcggcct gacgctcg 28

<210> 50
<211> 752
<212> DNA
<213> Trichoderma reesei

<400> 50
atggttgcct tttccagcct catctgcgct ctcaccagca tcgccagtac tctggcgatg 60
cccacaggcc tcgagcctga gagcagtgtc aacgtcacag agcgtggcat gtacgacttt 120
gttcttggag ctcacaatga tcatcgccgt cgtgctagca tcaactacga ccaaaactac 180
caaactggcg gacaagtcag ctattcgcct tccaacactg gcttctcagt gaactggaac 240
actcaagatg actttgttgt gggcgttggt tggacgactg gatcttctgc gtaggaggac 300
tcctcatcat tctgcacttt gaaagcatct tctgaccaaa agcttctctt agtcccatca 360
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Ala Glu Asp Ser Ser Ser Phe Cys Thr Leu Lys Ala Ser Ser Asp Gln
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Lys Leu Leu Leu Val Pro Ser Thr Leu Ala Ala Leu Leu Val Ser Thr
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Ala Glu Leu Ala Cys Phe Pro Ser Met Ala Gly Ala Pro Thr His Trp
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Leu Cys Arg Thr Thr Ser Met Leu Gly Pro Arg Leu Ala Cys Thr Leu
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Gly Arg Thr Thr Arg Leu Ser Leu Ser Lys Ala Gly Val Val Val Val

225 230 235 240
Leu Pro His Arg Val Ser Ala Thr
245